USGS
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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

September 2009

The primary metals leading index continued its upward climb in August, increasing for the fifth consecutive month, and its growth rate is well above the threshold that signals an increase in industry activity. Furthermore, the global economic climate appears strong enough to support a recovery in the primary metals industry. The metals price leading index growth rate has risen to a 34-year high and is indicating further increases in metals price growth in the near term.

The primary aluminum and the aluminum mill products indexes are suspended because of discontinued availability of industry-specific historical data. The USGS will continue to calculate the steel and copper composite indexes.

The **primary metals leading index** increased 7.5% in August to 136.8 from a revised 127.3 in July. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend increased to 13.2% from a revised -3.4% in July. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, while a growth rate below -1.0% indicates a downward trend. For an explanation of these indexes and a definition of the primary metals industry, see page 10.

All four of the available index components increased in August. The JOC-ECRI metals price leading index growth rate made the largest contribution, 3.6 percentage points, to the overall increase in the leading index. This indicator has steadily grown since the beginning of the year. The stock price index combining construction and farm machinery companies and industrial machinery companies rebounded in August, contributing 2.0 percentage points to the leading index. The Institute for Supply Management's PMI crossed the threshold that denotes an increase in U.S. manufacturing activity, adding another 1.0 percentage point. The average workweek in primary metals establishments appears to have begun lengthening. In August, it contributed 0.7 percentage points to the leading index. The primary metals leading index will likely be revised next month when the remaining four components become available.

The rising primary metals leading index and its high growth rate suggest that the decline in primary metals activity has ended and a recovery in the metals industry could soon be underway. Economic conditions in the Unites States and other countries appear to be strong enough to elevate metals demand. Nevertheless, activity growth in the U.S. primary metals industry may be slow to modest in the near term.

The **steel leading index** declined 0.9% in July, the latest month for which it is available, to 101.7 from a revised 102.6 in June. However, its 6-month smoothed growth rate increased to -4.1% from a revised -5.1% in June. Five of its components decreased in July with the largest declines coming from a 1-hour shorter average workweek in iron and steel plants and 2-percentage-point lower inflation-adjusted M2 money supply growth rate. However, the rising PMI and increased car and light truck sales offset much of those declines. While the steel leading index growth rate is still negative, it has generally increased since last year and is nearing the threshold that would indicate an end to the decline in U.S. steel industry activity.

The **copper leading index** increased 2.3% in July to 112.8 from a revised 110.3 in June, and its 6-month smoothed growth rate increased to 2.2% from a revised -4.1% in June. Additional overtime hours in copper rolling, drawing, extruding, and alloying plants accounted for nearly half of the gain in the copper leading index. The high copper price also made a hefty contribution to the leading index. Dips in the index for new housing permits issued and the yield spread between the U.S. 10-year Treasury Note and the federal funds rate in July held the leading index down only slightly. The copper leading index growth rate is now positive and is suggesting that the decline in domestic copper activity could end in the near term.

Metals Price Growth Set to Continue

The **metals price leading index** increased 1.2% to 113.6 in July, the latest month for which it is available, from a revised 112.3 in June. Its 6-month smoothed growth rate continued to soar, reaching 18.6% from a revised 17.1% in June. That marks the

index's highest growth rate since July 1975. Two of its three available indicators increased. The growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products made the largest positive contribution, 0.7 percentage points, to the net increase in the leading index. The rising growth rate of the trade-weighted average exchange value of other major currencies against the U.S. dollar also contributed 0.7 percentage points to the leading index. Meanwhile, a slightly lower yield spread between the U.S. 10-year Treasury Note and the federal funds rate contributed -0.2 percentage points. The fourth component, the growth rate of the Economic Cycle Research Institute's (ECRI) 19-Country Long Leading Index, is only available though June. It is relatively high in positive territory, indicating further increases in economic activity for most major industrialized countries. This index signals changes in the growth of economic activity about 5 months in advance. The metals price leading index signals major changes in the growth rate of nonferrous metals prices an average of 8 months in advance.

The growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, which is an indicator of supply, declined in July, as it has every month this year. Shrinking metal inventories and the high metals price leading index growth rate indicate further metals price growth. However, metals oversupply in China, which is a major metals consumer, could undermine price growth.

The business cycle and inventories are only two factors in metal price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, foreign exchange rates, geopolitical instability, and production costs.

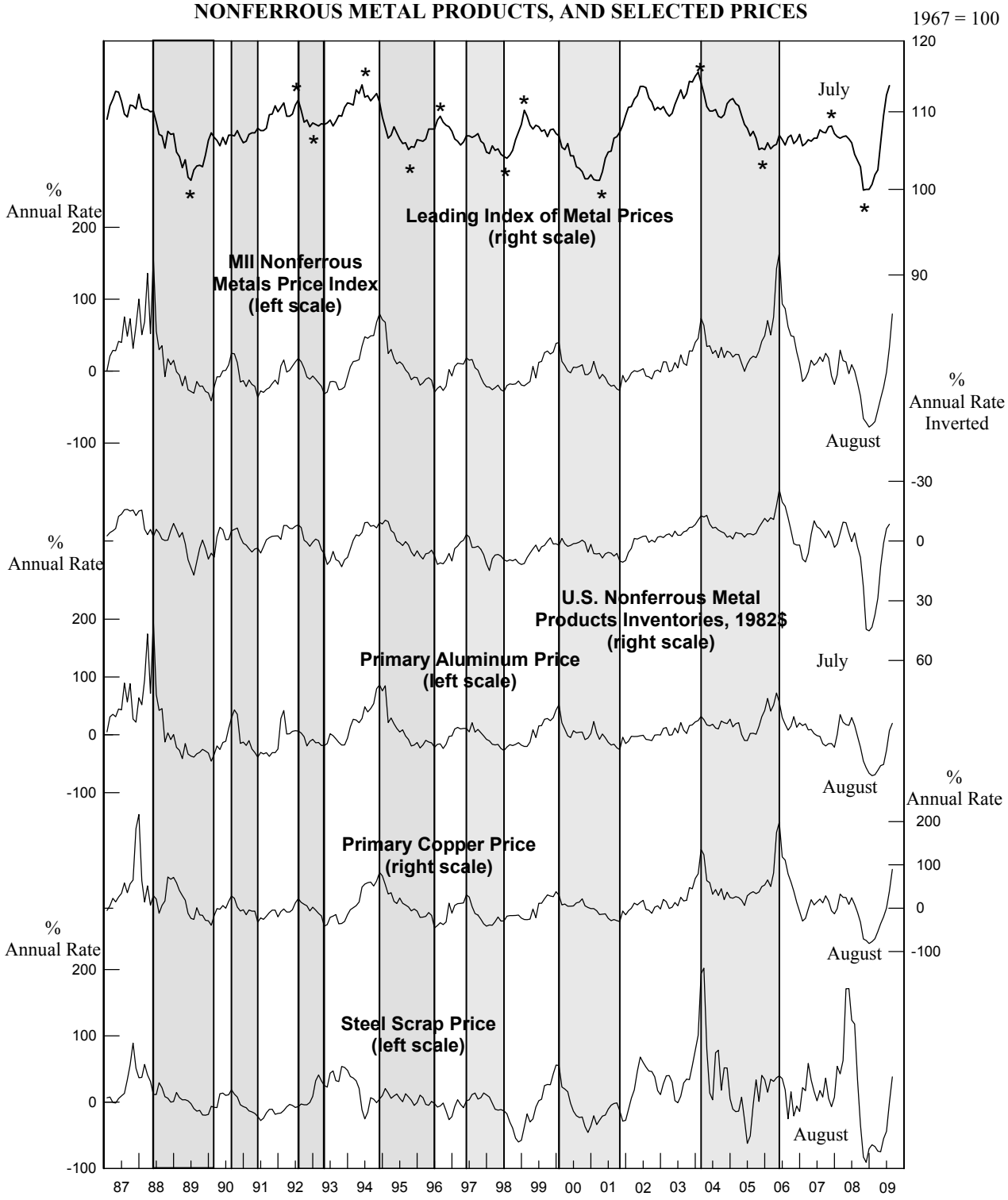
Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
2008						
July	104.4r	-0.1	-4.1	16.1	8.7	117.7
August	103.6r	-16.3	2.9	-2.7	-9.5	33.4
September	102.8r	-34.8	8.2	-21.9	-32.2	-34.1
October	99.9	-65.9	23.1	-45.4	-70.8	-82.7
November	100.0	-71.4	44.3	-57.2	-74.2	-90.8
December	100.0	-77.9	45.1	-66.5	-81.2	-70.2
2009						
January	100.6r	-74.7	43.2	-70.8	-76.9	-64.3
February	101.8r	-70.2	37.1	-69.3	-70.3	-67.0
March	102.4r	-54.1	28.7r	-61.6	-53.5	-74.0
April	105.9r	-38.1	12.7r	-53.4	-35.6	-74.9
May	109.5r	-22.6	1.1	-51.2	-19.8	-55.1
June	112.3r	-1.6	-6.2	-26.9	0.2	-44.0
July	113.6	33.3	-8.4	7.2	39.7	-0.7
August	NA	79.3	NA	19.8	89.7	38.1

NA: Not available **r:** Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Economic Cycle Research Institute's 19-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.
Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

U.S. Geological Survey, September 2009

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
September	141.0	-10.8	101.6	-6.8
October	132.1	-20.2	98.5	-11.6
November	127.0	-24.4	94.3	-17.5
December	124.9	-24.9	90.4	-22.4
2009				
January	124.5	-23.4	87.3	-25.5
February	121.9	-24.4	85.0	-26.8
March	120.0r	-24.3r	82.6r	-28.2r
April	120.9r	-20.5r	81.4r	-27.5r
May	123.7r	-14.0r	80.1r	-26.9r
June	126.0r	-8.1r	79.4r	-25.0r
July	127.3r	-3.4r	81.3	-18.4
August	136.8	13.2	NA	NA

NA: Not available **r:** Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**July**	**August**
1. Average weekly hours, primary metals (NAICS 331)	0.6r	0.7
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	-0.1r	2.0
3. Ratio of price to unit labor cost (NAICS 331)	0.1	NA
4. JOC-ECRI metals price index growth rate	0.8r	3.6
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	0.2	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 2005$	-1.0	NA
8. PMI	0.6r	1.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.1r	7.3

Coincident Index	**June**	**July**
1. Industrial production index, primary metals (NAICS 331)	0.3	0.6
2. Total employee hours, primary metals (NAICS 331)	-1.4r	0.6
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	0.2	1.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.8r	2.3

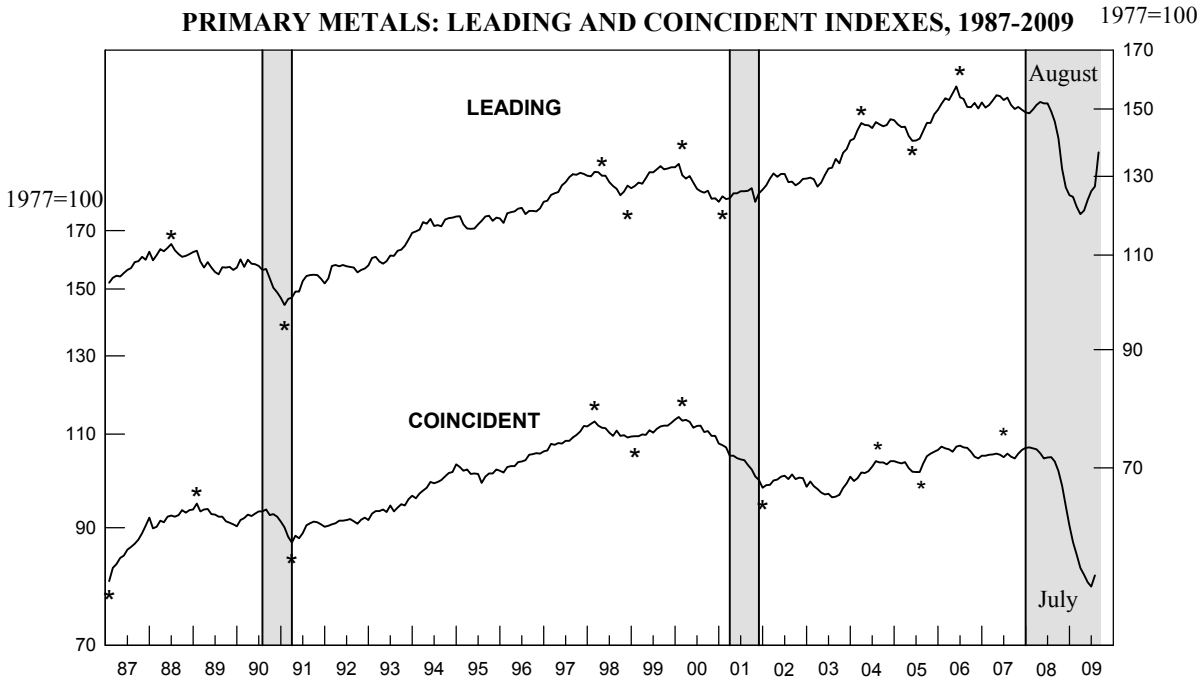
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available **r:** Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

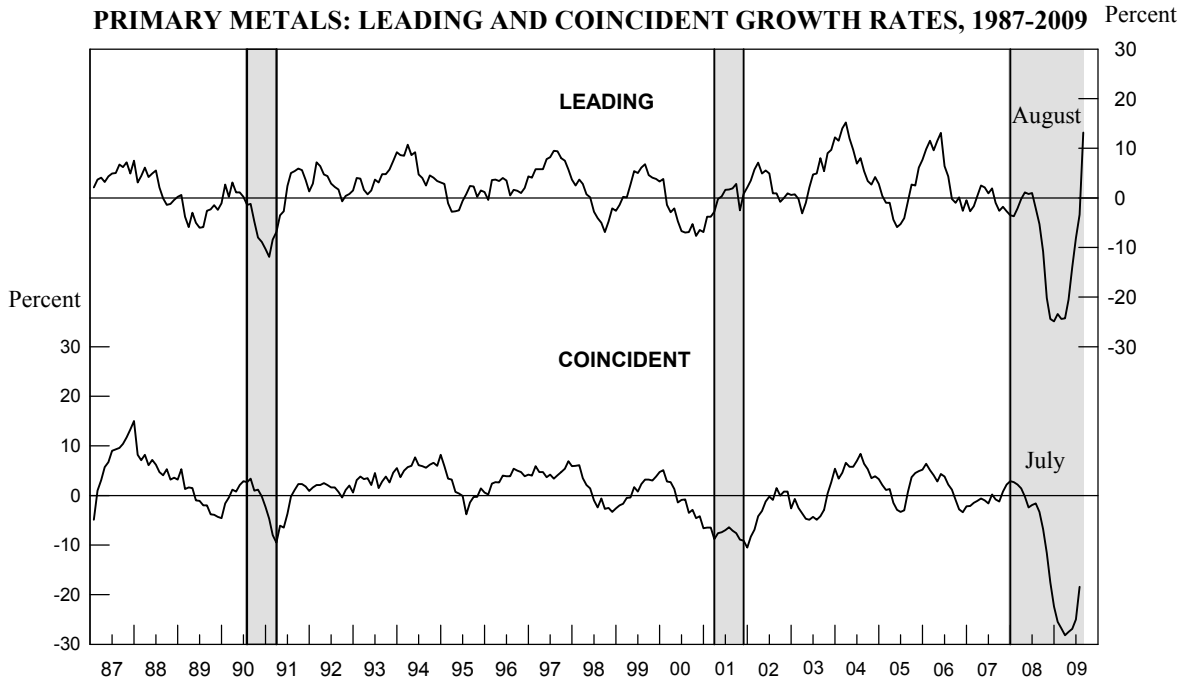
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2009

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
August	113.3	-7.9	101.4	-3.1
September	108.1	-15.1	99.3	-6.8
October	103.3	-20.8	96.7	-10.9
November	99.7	-24.3	91.9	-18.0
December	101.4	-19.9	88.1	-22.6
2009				
January	102.0	-17.3	85.5	-25.0
February	100.7	-17.6	84.4	-24.6
March	99.7r	-17.2	82.5	-25.4r
April	99.4	-15.4	80.3	-26.6
May	101.4	-9.8	79.8r	-24.7r
June	102.6r	-5.1r	80.7r	-20.2r
July	101.7	-4.1	81.2	-16.2

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

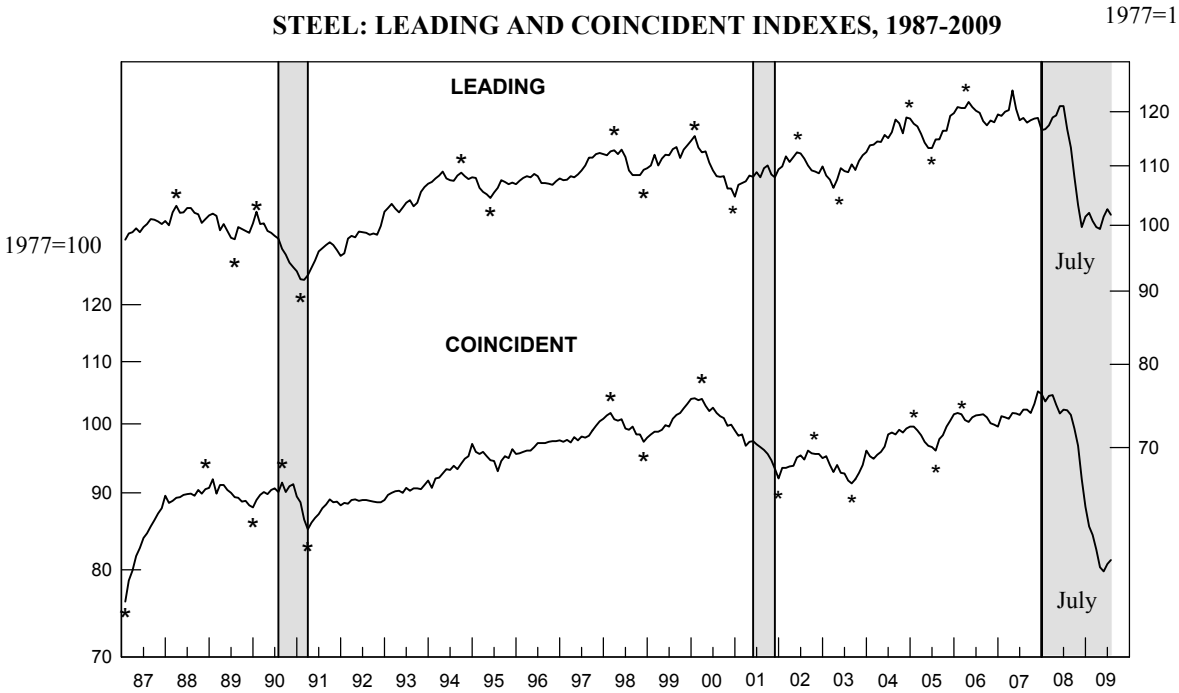
Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	-0.2	-0.9
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	1.0	-0.2
3. Shipments of household appliances, 1982$	-0.3r	0.0
4. S&P stock price index, steel companies	0.7	-0.3
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.1	0.6
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.3	0.4
7. Index of new private housing units authorized by permit	0.5	-0.1
8. Growth rate of U.S. M2 money supply, 2005$	-0.9r	-1.0
9. PMI	0.3	0.6
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.3r	-0.9
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	1.4r	0.5
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	0.3	0.7
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	-0.7	-0.6
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	1.1r	0.7

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

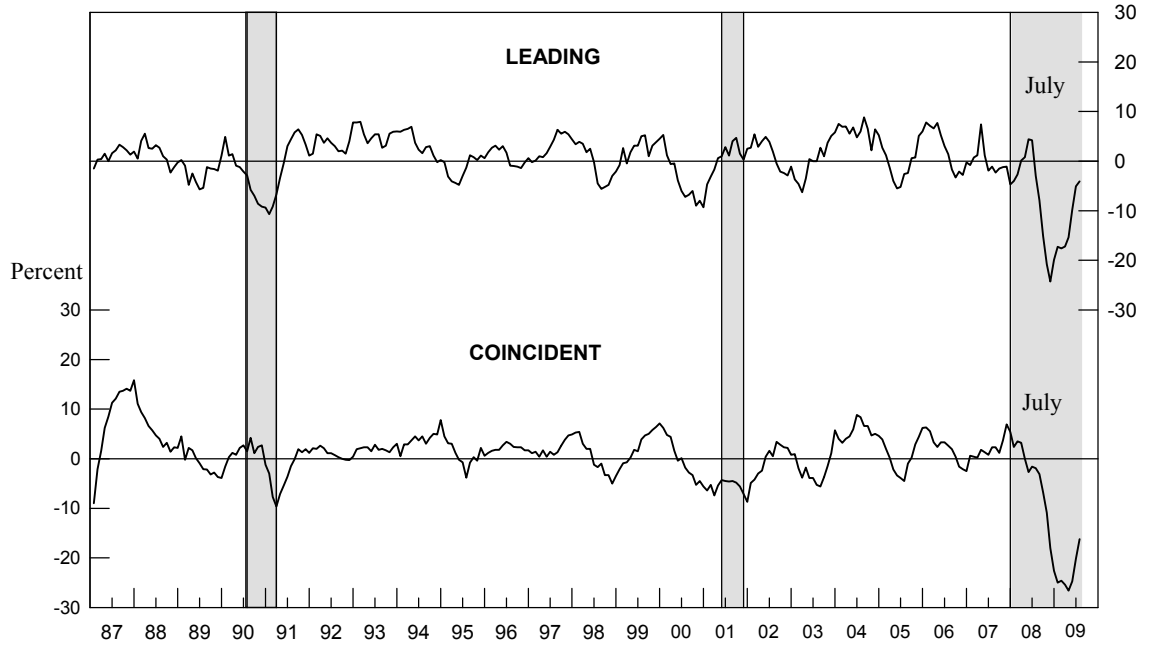
r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2009

Table 6.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2008				
August	122.7	-2.6	102.1	-2.9
September	121.8	-3.6	103.4	-0.1
October	114.7	-13.4	101.3	-3.7
November	110.4	-18.4	99.6	-6.3
December	108.5	-19.7	98.4	-8.1
2009				
January	107.2	-19.8	97.9	-8.5
February	103.7	-23.0	94.9	-12.9r
March	102.3r	-22.7	96.0r	-9.9r
April	105.7	-15.5r	93.4r	-13.3r
May	107.9	-10.1	92.6r	-13.3r
June	110.3r	-4.1r	92.5r	-11.8r
July	112.8	2.2	95.0	-5.6

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

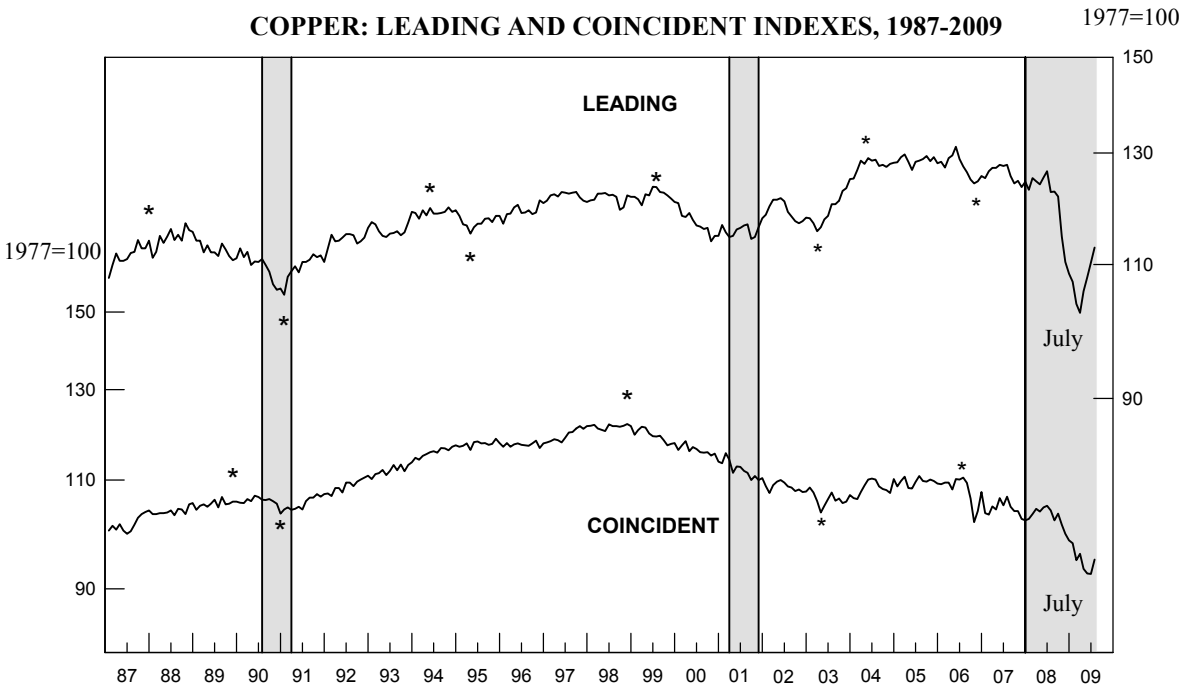
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

	June	July
Leading Index		
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	1.0	1.1
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	0.0r	0.5
3. S&P stock price index, building products companies	-0.2	0.2
4. LME spot price of primary copper	0.4	0.7
5. Index of new private housing units authorized by permit	0.7r	-0.1
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.3	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	2.2r	2.3
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	-0.4r	0.0
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	0.3r	2.6
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.0r	2.7

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

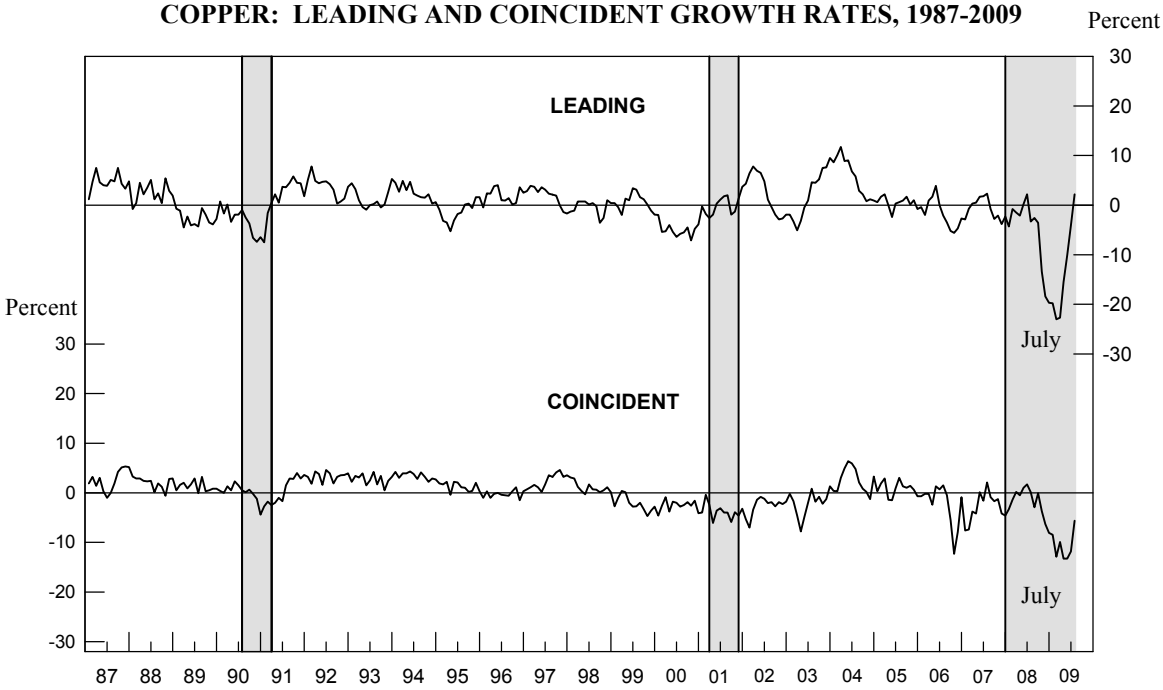
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 1987-2009



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1987-2009



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2009

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below –1.0% usually means declining growth.

The next update for these indexes is scheduled for release on the World Wide Web at 10:00 a.m. EDT, Friday, October 16. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/

The ***Metal Industry Indicators*** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Gail James (703-648-4915; e-mail: gjames@usgs.gov) and Ken Beckman (703-648-4916; e-mail: kbeckman@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990s. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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Reston, Virginia 20192